Variations in the Mineral Content of Bottled "Still" Water Across Europe: Comparison of 182 Brands Across 10 Countries

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Variations in the Mineral Content of Bottled "Still" Water Across Europe: Comparison of 182 Brands Across 10 Countries

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Abstract

Introduction: Kidney stone disease (KSD) is a highly prevalent disease worldwide. As water intake and its mineral content influence stone formation and recurrence, patients and physicians must be aware of the mineral content of drinkable water. We analyzed commercial bottled still water within Europe to assess the variation in its mineral composition across different manufacturers and countries.

Materials and Methods: Data on the mineral composition of bottled still water regarding bicarbonate, calcium, magnesium, potassium, sodium, and sulfate concentration (mg/L) were collected from ten European countries. To collect the data, the two main supermarket chains in each participating country were either visited to check for the ingredient label on bottles or the online shop was consulted through the website of the supermarket in question. Descriptive statistics such as simple boxplots were used to illustrate the variation in mineral content.

Results: One hundred eighty-two different commercial water brands were analyzed. Up to a fivefold variation in average concentrations per mineral between countries was observed. For calcium, a wide distribution was found in France and Switzerland compared with other countries with calcium levels ranging from 10.5 to 565 mg/L and 8.4 to 579 mg/L, respectively. By consuming 2 L of water with such high calcium levels, the daily reference intake for calcium is already achieved.

Conclusions: The mineral content of bottled still water across Europe varies greatly. For patients with KSD it is important to be aware of the mineral content of the water they drink, as it might influence stone recurrence rates and necessitate alterations of their diet.

Keywords: kidney stone disease, mineral content, mineral water, still water, urolithiasis

Introduction

Kidney stone disease (KSD) is a common condition, characterized by the formation of stones within the urinary tract due to urinary supersaturation of crystal-forming substances such as calcium and oxalate. It is a potentially complex and highly prevalent disease worldwide requiring a meaningful approach, as stone recurrence rates are high. In Europe, ~5%–10% of the general population suffered from KSD in 2011 and both prevalence and incidence have risen significantly over time.[1,2] The lifetime prevalence is now estimated to be 14%.[3] Since KSD is a relapsing disease with stone recurrence rates up to 26 per 100 persons-years without treatment, an adequate metaphylaxis is of great importance.[4]

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Recent data also suggest that on economic evaluation of KSD on a long-term follow-up, it is a costly disease, comparable to the combined cost of prostate and bladder cancer.[2,5]

One of the earliest generally accepted hypotheses suggests a beneficial and preventive effect on KSD formation by drinking sufficient amounts of water. Studies have shown that by increasing the fluid intake to achieve a urinary output of 2 L or more per day, stone recurrence rates in patients with idiopathic calcium stones drop significantly.[6,7] This phenomenon can be explained by the fact that an increased urine production results in dilution of urinary lithogenic factors such as calcium, oxalate, and uric acid, thereby reducing crystallization of calcium salts. In addition, increased diuresis will help prevent stagnation of urine within the urinary tract, a mechanical risk factor for stone formation.[8,9]

Historically, patients with idiopathic calcium stones were prescribed a low-calcium diet as a high dietary calcium intake was believed to provoke the formation of calcium-containing kidney stones. However, more recently, studies have demonstrated that a higher calcium intake reduces the risk of KSD by $\sim$28%–50%.[10–12] The underlying mechanism is the binding of calcium to dietary oxalate, causing a reduction in oxalate absorption. Consequently, urinary oxalate excretion declines, preventing the formation of calcium oxalate crystals.[13,14] Therefore, nowadays patients are advised to consume the recommended daily dietary intake of calcium of 1000–1200 mg.[15,16] Magnesium might also have a preventive effect on stone formation, as it likewise complexes with oxalate. A study performed in men demonstrated a reduced risk of stone formation with higher dietary magnesium. However, this theory has not been proven in women.[17]

A high intake of water and adequate amounts of certain minerals, such as calcium, are essential for patients suffering from KSD. As hydration is the cornerstone in the prevention of urolithiasis, one must realize that the mineral composition of drinking water itself may also affect urinary levels of calcium and oxalate, potentially influencing the risk of stone formation. Studies conducted in Spain and France have already demonstrated an enormous variation in mineral composition of bottled drinking water between different commercial brands.[18,19] Therefore, the aim of this study is to analyze bottled still water within Europe to assess the variation in mineral composition across different manufacturers and countries.

Materials and Methods

This descriptive study was conducted to gain insight into the variation of the mineral composition of bottled drinking water from different commercial water brands within Europe. Data on the mineral composition of bottled drinking water were collected from 10 European countries: Belgium, France, Germany, Greece, Italy, the Netherlands, Poland, Spain, Switzerland, and the United Kingdom. To collect the data, the two main supermarket chains in each participating country were either visited in person to check for the ingredient label on bottles from each water brand or the online shop was consulted through the website of the supermarket in question. Data on ''bottled still water'' regarding bicarbonate (HCO^{3-}), calcium (Ca), magnesium (Mg), potassium (K), sodium (Na), and sulfate concentration (SO_4^{2}) (mg/L) were collected and analyzed. All data presented in this study were collected from October to December 2019.

Statistical analysis

All data were analyzed by using the software Statistical Package for Social Sciences (SPSS) Statistics, version 26 (IBM Corp., Armonk, New York, USA). Given that the data were not normally distributed, the data were treated as nonparametric data. Therefore, for all six minerals analyzed the data are expressed as median with interquartile range (IQR). Simple boxplots were used to provide a visual representation of the data and to examine the distributional features of the mineral composition of still water among the participating countries. The boxplots display the minimum (within the lower fence), the first quartile, the median, the third quartile, and the maximum value (within the upper fence). Outliers ($1.5 \times$ IQR) and extreme values ($3 \times$ IQR) are included in the boxplots as, respectively, circles and asterisks.

Results

The mineral composition of 182 different commercial water brands for bottled still water across ten European countries was evaluated. On average, 18.2 brands per participating country were analyzed. Fourteen commercial water brands (Acqua Panna, Albert Heijn, Bar le Duc, Chaudfontaine, Contrex, Evian, Hépar, Montecalm, Nestlé Pure Life, San Benedetto, Solan de Cabras, Spa Reine, Vittel, Volvic) were available in up to five different countries.

The mineral composition of still water by country presented as median [IQR] is shown in Table 1. Comparison between countries indicates a great variation in median concentration per mineral. For bicarbonate, for example, the median mineral concentration varies from 106.0 mg/L in Italy to 314.4 mg/L in Poland. The median calcium concentration of still water varies from 32.2 mg/L in Italy to 108.0 mg/L in Switzerland. It is noteworthy that of all 10 participating countries, Italy is the country with the lowest median mineral concentrations regarding bottled still water, except for sulfates.

Figure 1 visualizes the distribution of the bicarbonate (Fig. 1A), calcium (Fig. 1B), magnesium (Fig. 1C), potassium (Fig. 1D), sodium (Fig. 1E), and sulfates (Fig. 1F) concentration of still water among the 10 participating countries. The boxplots graphically demonstrate that mineral concentrations vary between the participating countries. Still water brands in France and Switzerland, for example, show a wide variability for calcium concentration compared with the other participating European countries. With a minimum concentration of 10.5 mg/L and a maximum of 565 mg/L, the range for calcium content in France reaches 554.5. Calcium content in Swiss bottled still water varies even more. With a minimum concentration of 8.4mg/L and a maximum of 579 mg/L, the range for calcium content in Switzerland reaches 570.6. The same applies for the sulfate concentration in France with a range score as high as 1524.

Still water brands sold in Greece show the least variation in mineral concentration for bicarbonate, calcium, magnesium, and potassium. A complete overview of all still water brands included in this study sorted by country can be found in the Appendix Table 1A.

Discussion

This descriptive, multinational study illustrates the variations in the mineral content of 182 commercial brands of

TABLE 1. MINERAL COMPOSITION (MG/L) OF BOTTLED STILL WATER BY COUNTRY (MEDIAN [INTERQUARTILE RANGE])

	Mineral composition (mg/L)					
Country	*Bicarbonate*	*Calcium*	*Magnesium*	*Potassium*	*Sodium*	*Sulfates*
Belgium	301.0 [180.0–360.0]	66.8 [16.5–101.0]	18.0 [1.8–26.0]	2.0 [1.0–4.0]	8.5 [3.3–15.6]	18.0 [10.0–40.0]
France	163.5 [127.0–372.0]	68.0 [19.0–468.0]	26.0 [8.0–56.0]	2.8 [1.6–4.0]	6.5 [3.0–11.6]	24.0 [8.1–1121.0]
Germany	270.0 [182.0–357.0]	94.0 [47.0–142.0]	25.3 [6.7–43.5]	1.8 [1.2–4.7]	14.4 [7.1–17.3]	39.6 [9.0–162.0]
Greece	244.0 [182.0–286.0]	79.7 [60.0–93.1]	7.0 [3.3–12.8]	0.8 [0.6–1.0]	4.9 [4.4–7.8]	9.2 [5.0–14.0]
Italy	106.0 [50.0–296.0]	32.2 [11.8–60.4]	4.9 [3.7–22.1]	0.8 [0.4–1.6]	2.2 [1.0–6.0]	8.6 [6.0–22.0]
Netherlands	201.0 [106.0–305.0]	60.0 [15.0–80.0]	6.3 [2.5–18.0]	1.0 [0.6–3.3]	10.6 [4.8–36.2]	28.0 [10.0–37.0]
Spain	248.0 [146.6–296.0]	56.5 [27.9–77.8]	15.6 [5.6–23.4]	1.3 [0.9–2.3]	9.5 [4.8–21.7]	14.0 [5.1–29.6]
Switzerland	252.0 [226.0–289.0]	108.0 [89.0–221.0]	24.0 [17.0–39.0]	2.0 [1.0–3.0]	5.0 [4.0–6.5]	179.0 [25.0–719.0]
Poland	314.4 [223.4–512.0]	70.1 [43.9–111.2]	19.7 [9.9–28.6]	1.3 [0.9–2.5]	9.9 [7.3–11.1]	7.9 [0.0–36.3]
United Kingdom	167.3 [74.0–240.0]	55.0 [12.0–59.0]	10.0 [3.5–19.0]	1.2 [1.0–2.5]	11.9 [7.0–15.0]	12.0 [9.0–14.0]

bottled still water across ten European countries, including Belgium, France, Germany, Greece, Italy, the Netherlands, Poland, Spain, Switzerland, and the United Kingdom. Our data confirm that the mineral content of bottled still water differs greatly within Europe. For instance, the average content for bicarbonate, calcium, and potassium in one country can be up to three times higher in another country. What is more, the average magnesium, sodium, and sulfates content varies up to fivefold within Europe. On average, apart from sulfates, the lowest mineral content of still water was found in Italy.

Remarkably, calcium levels found in bottled still water sold in France and Switzerland are widely distributed as illustrated by a range of 554.5 and 570.6 respectively. With a calcium concentration as high as 579 mg/L, *Adelbodner Cristal* from Switzerland contains the highest calcium levels of all still waters included in our study. Other still waters with calcium levels >400 mg/L are *Hépar* (549 mg/L) sold in Belgium and France, *Farmer Mineral Blau* (546 mg/L), *Adello Mineral* (530 mg/L), and *Eptinger Still* (510 mg/L), all from Switzerland; *Contrex Still Water* (468 mg/L) available in Belgium, France, and Germany; and *Carolinen Naturelle* (421 mg/L), which is sold in Germany. These commercial brands are all represented as extreme values in Figure 1B. In contrast, *Lauretana Still Water*, which is sold in Italy only contains 1.5 mg calcium per liter, which illustrates to what extent calcium levels vary across Europe.

The daily reference intake for calcium is 1000–1200 mg.[15,16] This can be achieved by consuming dairy products such a yoghurt, milk, or cheese, which are all known for their rich calcium content. However, our study shows that some commercial bottled still waters also contain a significant amount of calcium. As a high water intake is essential in the prevention of KSD, patients and physicians must be aware of the great variations in calcium content among different commercial brands for bottled still water across Europe. Although 2 L of *Lauretana Still Water* does not significantly influence calcium intake, 2 L of *Adelbodner Cristal*, the water with the highest calcium content in Europe, actually does. By drinking 2 L of the latter, patients would already achieve the daily recommended amount of calcium. Therefore, consumption of other calcium-rich products should be avoided to prevent excess urinary calcium excretion and thus risking the formation of calcium-containing kidney stones. As dairy intake and water consumption preferences differ among patients, physicians should provide individualized and patient-specific recommendations considering their patient's kidney stone diet plan, especially for those kidney stone patients who drink even more than 2 L of water a day. For them, it is even more important to be aware of the mineral content of the water they drink and to realize what effects it could have on their disease.

Besides paying attention to the calcium levels of mineral water, patients and their treating urologists should also consider the content of still water regarding other minerals as they could influence stone formation as well. A study performed by Nouvenne and colleagues demonstrated that patients with idiopathic calcium stone disease and hypercalciuria benefit from a low-sodium diet as excessive sodium intake increases urinary calcium excretion.[20] However, some mineral waters included in this study contain significant amounts of sodium. *Staatl. Fachingen*, for example, sold in Germany, contains as much as 564 mg/L. Drinking this type of water significantly contributes to the risk of excessive sodium intake, which is already a global health problem.

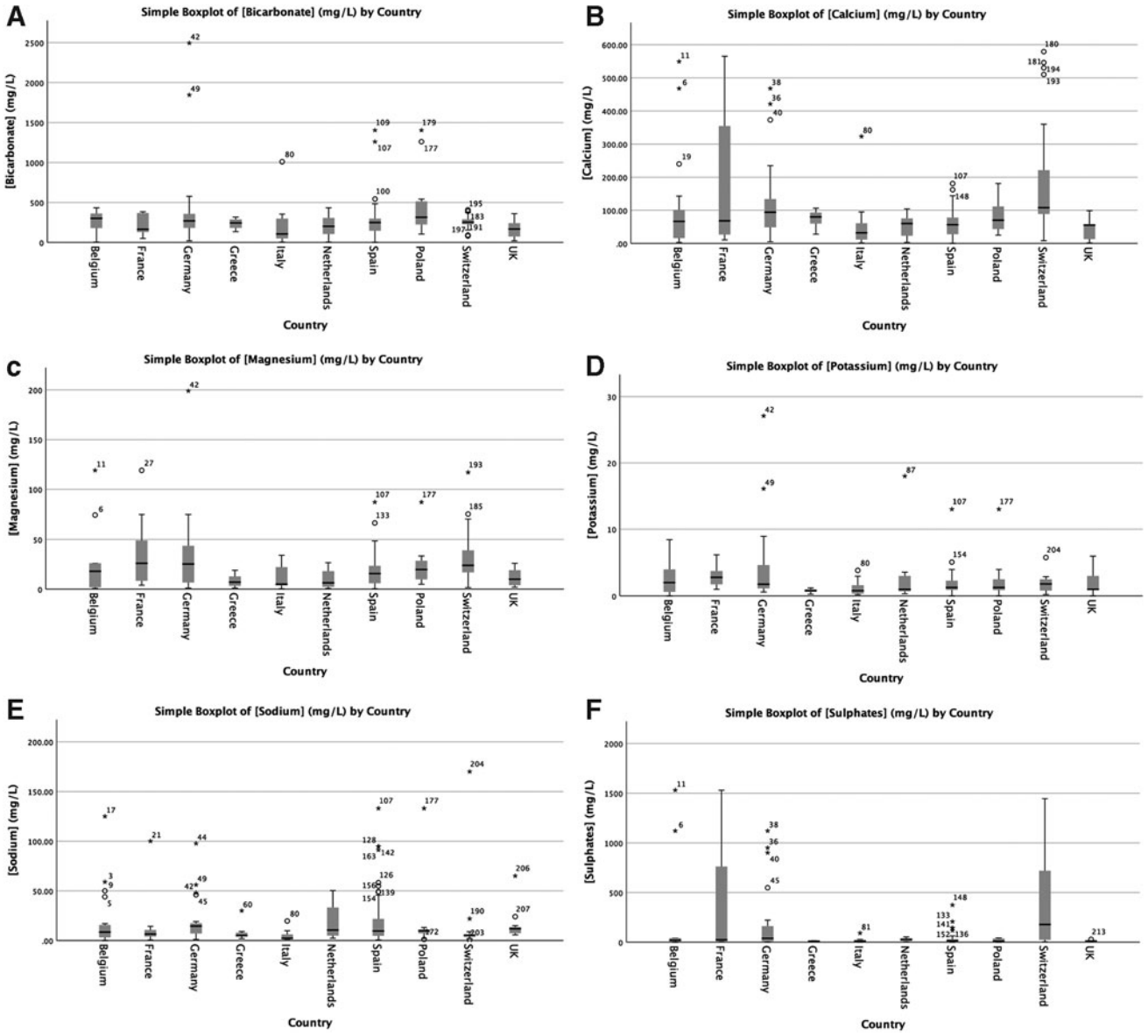

FIG. 1. Simple boxplots per mineral (mg/L) by country.

Contrarily, other minerals may have beneficial effects regarding stone formation. Alkalization of the urine results in an increase of urinary excretion of citrate, an inhibitor of calcium oxalate stone formation.[21] As bicarbonate provides an alkali load, several studies have been conducted to evaluate the effect of bicarbonate-rich mineral water on stone formation. Karagülle and colleagues showed that urinary pH increases significantly to metaphylactic levels by drinking 1.5 L of mineral water with a bicarbonate content of 2673 mg/L.[22] Another study, conducted by Siener and colleagues, demonstrated that besides an increase in urinary pH, the consumption of 1.4 L of bicarbonate-rich mineral water (3388 mg/L) results in an increase in citrate excretion from 3045 to 4554 mmol/24 hours.[23] However, our study did not include mineral waters with such high bicarbonate content, suggesting that they may not be obtained easily. The water with the highest bicarbonate content included in this study is *Heppinger Extra Heil Water*, which is sold in Germany (2495 mg/L).

To the best of our knowledge, this is the first multinational study analyzing the mineral content of bottled still water across Europe. However, our study is limited by the fact that only 10 European countries were included, which represents only 19.6% of all European countries. Second, only mineral waters available in the two largest supermarket chains were included. Therefore, to provide a complete overview of the mineral content of still water across Europe, further research must be done. An analysis of the mineral content of sparkling water is also suggested, as some patients may prefer sparkling water over still water. Although the consumption of bottled water is increasing across Europe—in some countries to such an extent that it exceeds the consumption of tap water[24]—an analysis of the mineral content of tap water across Europe would be of great interest, especially for those countries where the daily water consumption mainly consists of tap water.

To adequately access the effect of different mineral waters on stone recurrent rates, a long-term study including patients

with different types of kidney stones would be recommended. Perhaps health authorities across Europe need to standardize the amount of minerals in all still, sparkling, and tap water.

Conclusions

The mineral content of commercially available bottled still water across Europe varies greatly. For patients with KSD it is important to be aware of the mineral content of the water they drink, especially for promotors of kidney stone formation such as calcium, as it might necessitate alterations of their diet and negatively influence stone recurrence rates. Physicians should facilitate patients in choosing an adequate and individualized kidney stone preventive diet, including the water they drink.

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Abbreviations Used
IQR = interquartile range
KSD = kidney stone disease

(*Appendix follows* →)

Appendix

Appendix Table A1. Mineral Composition (mg/L) Per Water Brand Per Country

Water brands per country	*Mineral composition (mg/L)*					
	Bicarbonate	*Calcium*	*Magnesium*	*Potassium*	*Sodium*	*Sulfates*
Belgium						
Albert Heijn		10.4			**0**	
Bar le Duc	170	47	3.4	0.6	10.6	<1
Boni	345	59			59	
Bru	180	21	20	2	8	19
Chaudfontaine	305	65	18	2.5	44	40
Contrex	372	468	74	**0**	9	1121
Everyday Aurelie		106			3.5	
Everyday CristalRoc	200	73			4.5	
Everyday Louise	**432**	66			50	
Evian	360	80	26	1	6	12
Hépar	383.7	**549**	**119**	4	14.2	**1530**
Montcalm	**5.2**	**3**	0.7	0.6	2.2	10
Nestlé PureLife		70			2	
Ordal	317	143	7	5	17	**0**
Rocheval	297	96			10.6	
Spa reine	15	4	**1**	**0**	3	4
Val	220	6	1.8	**8.5**	**125**	18
Valvert		67.6			1.9	
Vittel		240			5.2	
Volvic		12			12	
France						
Abatilles	127	19	9	4	**100**	8
Aix Les Bains	337	68	35	1.6	9	61
Celtic	**48**	**10.5**	**4**	1.9	1.1	**6**
Contrex	372	468	74.5	2.8	9.4	1121
Courmayeur	130	**565**	56	2.8	**0.6**	1477
Evian	360	80	26	**1**	6.5	14
Hépar	383.7	549	**119**	4.1	14.2	**1530**
Ondine	163.5	46.1	4.3	3.5	6.3	9
Vittel	**384**	240	42	1.9	5.2	400
Volvic	71	11.5	8	**6.2**	11.6	8.1
Wattwiller	135	35	11	**1**	3	24
Germany						
Adelholzener Naturell	431	94.7	30.4	**0.6**	4.6	6.9
Aqua Nordic Naturell	195		3.7	**92**	19	
Bad Pyrmonter Naturell	253	53	24.5	0.9	5.2	9
Black Forest Still	30.5	6.7	2.6	1.7	**1.1**	**2.9**
Carolinen Naturelle	317	421	43	4.3	14.8	950
Christinen Carat Naturelle	282	106	8.4	1.5	11.4	61
Contrex Still	372	**468**	74.5		9.4	**1121**
Evian	360	80	26	1	6.5	14
Extaler Mineralquell Naturell	266	373	62.1	1.6	10.8	900
Gerolsteiner Naturell	577	125	44	5	17	24
Heppinger Extra Heil Water	**2495**	150	**199**	27.1	**481**	80
Ja! Mineral water Still 0.5L	189	67.5	12.5	1.1	15.2	59
Ja! Mineral water Still 1.5L	109	9.4	3	1.4	97.7	40.1
Rewe Beste Wahl Sport	296	235	66	3.1	46	548
REWE Beste Wahl Still	353	142	32.4	2.8	15	162
San Benedetto Still	296	51.4	29.7	0.97	6	4.2
Share Still	274	39.7	21.2	1.2	17.6	8.1
Staatl. Fachingen Still	1846	98.7	59.2	16.1	564	39
Vilsa Naturelle	175	47	3.6	2	16.4	10
Vio Still	152	51	5.3		15	19
Vittel	248	94	20		7.7	120

(*Appendix continued*)

Appendix Table A1. (Continued)

Water brands per country	Mineral composition (mg/L)					
	Bicarbonate	*Calcium*	*Magnesium*	*Potassium*	*Sodium*	*Sulfates*
Volvic Naturelle	74	12	8	6	12	9
Vöslauer Ohne	249	114.4	40.9	1.8	14	223
Voss	**<20**	**5**	**1**		6	
Greece						
Ab	236.25	79.65	4.24	0.87	4.35	**15.53**
Arethousa	286	64	**19**		7.8	6
Avra	182	60	8.9	**1.2**	**9**	14
Dirfys	286	64	19		7.8	6
Erymanthos	308	95.5	8.5	1	30	14.7
Korpi	**314.8**	**106.5**	3.3	0.68	4.7	**5**
Marata	236.25	79.65	4.24	0.87	4.35	**15.53**
Samaria	160	31	14	0.5	7	**5**
Theoni	149	42	**1**	**0.26**	**1.8**	**5**
Vikos	270	93.1	1.9	0.7	2.6	12.2
Yas	250	98	7		4.9	11
Zagori	244	83	3.06	1.02	2.85	9.15
Zaros	**135**	**28.2**	12.8	0.6	6.7	**5**
Italy						
Acqua Panna	106	32.2	6.5	0.8	6.6	22
Chiarella	217.8	40.6	22.1	0.2	0.9	8.6
Lauretana	**5**	**1.5**	**0.42**	**0.19**	1	
Levissima	56.8	19.9	1.7	1.6	2.1	16.9
Norda	50	11.8	3.7	0.82	2.2	6
Pejo	54	19	4.9	1.9	2.2	27.2
Primula	355	91	33.2	0.78	9.8	
Rocchetta	185.4	60.36	3.73	0.35	3.87	7.54
Rosalpe	27	5.6	3.9	0.24	**0.8**	
San Benedetto	296	51.4	29.7	2.97	6	4.2
San Bernardo	31	10.2	0.48	0.48	**0.8**	**1.5**
Sangemini	**1010**	**323**	16.5	**3.85**	**19.6**	
Vitasnella	324	95	**34**	1.5	3.7	**91**
the Netherlands						
Acqua Panna	106	32.2	6.5	0.8	6.4	22
Albert Heijn	360			2.7	5	
Albert Heijn Basic	280	**104**	3.7	1.8	3.7	**52**
Bar le Duc	170	47	3.4	0.6	10.6	**<1**
Chaudfontaine	305	65	18	2.5	44	40
Cristaline	**432**	66	26	**18**	50	34
Dalphin	212	71	6.5	3.3	30	37
Evian	360	80	26	1	6.5	14
Jumbo	190	97	10.8	3.4	18.5	
Just Water		15	2.35	**0.35**	**50.4**	35
Montcalm	**5.2**	**3**	**0.7**	0.6	**2.2**	10
Natural Cool		89.5		3.6	36.2	
Solan de Cabra	284	60	**26.7**	1	4.8	
Sourcy	180	49	6	1	10	10
Spa	17	5	2	0.5	3	4
Tavina Elegantia	36.5	7.86	2.46			
Poland						
Aquarel Nestle	482.3	112.2	24.3	4	13	**0**
Arctic	260.1	74.15	13.37	1.35	8.12	25.64
Cisowianka	542.6	131.2	22.48	0.78	10.71	2.58
Dobrowinka	276.9	58.12	**33.42**	**0**	2	**0**
Górska Natura	**104**	**25.2**	6.47	1.93	**1.04**	**0**
Jurajska	329.9	66.1	32.8	2.2	10	40.5
Kropla Beskidu	186.7	44.09	17.01	1	11.1	**43.62**
Mama I Ja	165.0	43.6	**5.05**	1.06	9.7	13.3
Nałęczowianka	453.7	110.2	23.1	2.8	11	**0**
Piwniczanka	1260	**180.8**	87	**13**	**133**	32

(*Appendix continued*)

Appendix Table A1. (Continued)

Water brands per country	Mineral composition (mg/L)					
	Bicarbonate	*Calcium*	*Magnesium*	*Potassium*	*Sodium*	*Sulfates*
Ustronianka	299	98.1	16.52	1.21	6.44	41.8
Żywiec Zdrój	**1403.7**	41.69	5.62	**0**	9.65	**0**
Spain						
Agua de Cuevas	246.9	47	25.4		1.6	13.5
Agua del Rosal	295	65.4	13.7		45.2	
Agua del Valle del Cardo		81	35		7	19
Agua Sana	**2.1**	**0.4**	0.7		5.8	**1.5**
Aguas de San Joaquín	165	35.7	16.5		8.3	3.7
Aigua mineral Bonpreu	147.2	47.07	7.27		8.4	29.1
Alzola	188	58.7	6.3		45.5	24.4
AquaBona Fontoira	152	3.4	7.5		11	8.9
AquaBona Fuenmayor	305	77	20.8		1.6	22.8
AquaBona Peña Umbría	298	55	28		5.4	7.3
AquaBona Santolin	274	92.4	2.73		2	6.5
Aquadeus	323	74.2	23.4	0.9	3.3	20.4
Aquarel	14.7	1.9	2.1		4.7	2.9
Auchan	168	28.8	19.7	1.7	8	13.5
Benassal	264	89.9	2.96		2.6	21.3
Bezoya	< 5	2.86	**0.36**		2.04	
Cabreiroà	193	10	5	2.1	58.2	
Caldes de Boì	34.6	5.4	0.5		21.7	13.2
Carrefour	266	21.5		3.5	**94.7**	11.5
Castrovita	118	39	2	<1	2	3
Fonsana	38	7			7	3
Font Agudes del Montseny	253	58.9	16.8		29.7	41.2
Font de Pla Nova	270	74	36	1.2	11	
Font del Pi	317	67	**66**		27	207
Font del Regàs	129.2	32.9	4.1		13.5	10.2
Font d'Or	78.8	26.4	3.2		9.2	13.7
Font Jaraba	297	99.6	32		37.1	144
Font Major	173	54.5	7.7		9.5	14.2
Font Natura	205.6	70.9	15.7		8.9	57
Font Selva	249	34	6.8	1	54.9	14.6
Font Vella	167	43.2	11.5		1.3	
Fontecabras	295	90.1	37.5		32.6	117
Fontecelta	266	21.5		3.5	**94.7**	11.5
Fuensanta	162	58	4.5	0.9	5.8	17.5
Fuente Bruma	75.9	10.7	8.3		13.1	3.7
Fuente Liviana	268.3	65.4	17	**0.4**	0.8	19.2
Fuente Primavera	297.2	88.7	23.4		18.6	43.9
Fuentedueñas	246		7.4		3	6.7
Insalus	149	**162**	20.6		10.7	**374**
La Platina	79	16	16		9	18
Lanjaròn	108	28.9	11.4		5.9	
Les Creus	119	28	7.3	1	11.7	12.3
Lunares	292	96.3	35.7	2.3	39	142
Marquesado	273.3	75.3	19.3	0.5	1.2	30.1
Mondariz	156	7.7	5.5	**5.1**	49	1.7
Monte Pinos	298	93.8	3.4		1.8	1.6
Na Taconera	275	144	28		49	
Ribagorza	331	67	27		24	18
Ribes	146	46.6	7		5.6	
San Vicente	109	14.9	9.8	2.6	14.2	9.9
Sant Aniol	349	91.3	17.5		6.4	
Sierra Cazorla	**408.7**	78.6	48.5	0.46	1.26	64
Solan de Cabras	284	60	26.7	1	4.8	21.8
Solares	249	75.2	15.6	1.7	91.1	37.2
Sousas	77.7		1.1	1.8		

(*Appendix continued*)

Appendix Table A1. (Continued)

Water brands per country	*Mineral composition (mg/L)*					
	Bicarbonate	*Calcium*	*Magnesium*	*Potassium*	*Sodium*	*Sulfates*
Valtorre	174	22.1	22		32.5	22.3
Veri	140	32.1	9.2		**0.5**	3.3
Viladrau	113	27.7	4.5		11.9	11.2
Switzerland						
Adelbodner Cristal	284	**579**	39	1.4	6.5	1268
Adello Mineral	291	530	36.5	1.7	5.8	1127
Allegra	344.2	100.4	23.7	0.7	2.6	59.3
Appenzell Mineral Leise	**407**	108	17	0.7	3	**3.8**
Aproz Cristal	250	360	70	2.5	6	930
Aquella Cristal	245	300	75	2.5	4	840
Valais Naturelle	225	90	22	2.5	7	110
Aquina Rot	246	174	33.5	2.8	4.4	362
Arkina Blau	355	85	25.7	0.8	8.9	40.8
Cristallo Still	254	221	65.4	2.7	4.3	597
Cristalp without CO_2	227.6	115.3	40.7	1.9	21.9	240.7
Eden	91.8	33.5	3.1	2.9	4.3	29.5
Elmer Mineral without CO_2	242	118	6.6	0.6	2.5	117
Eptinger Still	278	510	**117**	2.5	4.2	**1445**
Farmer Mineral Blau	287	546	35		6	1256
Henniez Blau	389	104	20	1	7	12
Knutwiler Grün	375	89	24	1.2	5	20
M-Budget without CO_2	**80**	100	20	0.5	5	280
OK.- Mineralwasser Blau	194	37.3	15.2	0.98	4.42	8.7
Saguaro Nature	277	136	42		1.8	268
San Clemente Naturale		**8.4**	**1.5**		1.8	7.8
Swiss Alpina Rot	239	208	37	1.9	5.2	480
Valser Silence	155	53.7	**1.5**	**0.2**	**0.2**	10
Zurzacher Naturelle	278	53.3	7.8	**5.8**	**154**	170
the United Kingdom						
Aqua Pura	**20**	14	3.5	2.5	12	14
Aquavia	74.25	**1.4**		**0.36**	**65**	
Buxton	248	55	19	1	24	13
Evian	**360**	80	**26**	1	6.5	14
Harrogate	215	57	19		8	13
Highland	150	40.5	10.1	0.7	**5.6**	**5.3**
Hildon		**98.5**	**1.62**		7.03	6.6
Nestlé Pure Life	184.6	59	10	1.2	11.9	9.7
Sainsbury's Caledonian	240	55	16	2	15	**28**
Tesco Ashbeck	25	11	3.5	2.5	10	11
Volvic	74	12	8	**6**	12	9

For each country, the minimum and maximum values per mineral are highlighted in bold.